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ABSTRACT

The stated central theme of this report is that the National Institute of Education give first priority to questions of efficiency in the supply of educational services. A tripartite definition of efficiency is proposed and explained: economic, technological, and social. The report is organized around discussions of some impediments to the realization of these three efficiencies. For each impediment or obstacle to the achievement of a particular kind of efficiency, there is a discussion of why the obstacle is a problem and what kinds of research have been or are currently being done with respect to the problem. New kinds of research or experimentation are proposed which might provide policy makers with guidelines for reducing the obstacles to these efficiencies. The final section coordinates the proposals and indicates research items that are of the highest priority: research and experimentation in decentralized decision making, assessment of institutional and classroom efficiency, development of a federal research school, experimentation and evaluation of complimentary services. (JA)

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December 1, 1971

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by

Charles S. Benson
James W. Guthrie
Alice S. Ilchman
University of California, Berkeley

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I. INTRODUCTION

In his special message to Congress on education reform, March 4, 1970, President Nixon proposed the establishment of a National Institute of Education "as a focus for educational research and experimentation in the United States." He furthermore charged the incipient NIE with several responsibilities. The Berkeley report on the future activity of the NIE suggests alternative means by which some of these responsibilities could be fulfilled. The central theme of our report is that the Institute give first priority to questions of efficiency in the supply of educational services. Our focus is largely, but not exclusively, elementary and secondary education.

Nevertheless, our approach is not unduly restrictive; the concept of efficiency is sufficiently comprehensive to allow examination of social as well as economic questions. Indeed, we propose that research projects be arrayed against a tri-partite definition of efficiency: economic, technological, and social. So also are examples of social

problems grouped under that tri-partite definition. We consider that we are making recommendations about the universe of educational research projects, subject to two main exceptions: neither revenue sources nor pedagogical theory will be discussed in the pages to follow.

DEFINITIONS

By economic efficiency we refer to the closeness of fit between the quality and variety of school outputs supplied and the kinds of outputs demanded by the immediate consumers of those outputs -- students and parents. Technological efficiency is primarily a matter of cost-effectiveness in the production of instructional and related goods. Social efficiency has to do with the distribution of educational services among social classes and groups. It is easiest to define gain in social efficiency in negative terms, i.e., to reduce the concentration by social class and group of educational, occupational, and personal failure.

Economic Efficiency

The problem of economic efficiency is most commonly, but not exclusively, a problem of large metropolitan areas. The socially heterogeneous populations of big cities have divergent demands for educational outputs, and at present these demands are not all met by big city schools. The rich demand elite schools for their children, a demand in conflict

with the egalitarian pressures of the metropolis. The result is that the rich either move to elite, largely-white suburbs or send their children to private schools.

Middle class families, too, are dissatisfied with the character of outputs provided by the public schools and often-times opt to send their children to parochial schools. The poor, of course, have no alternative to the public schools, although there is little evidence to indicate they are satisfied with the educational services provided to them.

Evidence of economic inefficiency is also suggested by the increasing popularity of schemes to "privatize" education through educational vouchers. Parents wish to have greater opportunity to participate in the decision of the kinds of educational outputs received by their children.

Lastly, the public schools do not meet the demands of those families whose children attend alternative schools. That is, the public schools at present cannot accommodate life-styles which substantially deviate from the norm.

Technological Efficiency

Technological efficiency has become an increasingly important social objective as the costs of education have risen. Costs of education have risen in turn largely because education is a labor intensive activity,

and, in addition, there have not proven to be large trade-offs between the use of human and physical capital.

Furthermore, technological efficiency has proved to be an elusive goal in that relatively little is known about what makes an institution efficient. As we are not even certain about what schools maximize, if anything, much less know what the outputs of the educational process are, research on institutional efficiency has remained in a primitive state. However, the primary cause of technological inefficiency (and the apparent failure of compensatory education) is the dearth of knowledge regarding how children learn.

That the efficient use of educational resources will continue to be a major social need is indicated by the increasing reluctance on the part of voters to provide schools with the requisite funds to carry on in the traditional manner. For example, school bond issues are repeatedly defeated at the polls, the school systems from Chicago to St. Albans, Vermont, have been experiencing school deficits.

Social Efficiency

Social inefficiency is discrimination on the basis of race or social class with respect to educational outputs and the rewards accompanying those outputs. The U.S. Supreme Court, of course, has already ruled in Brown v. Board of Education that discrimination on the basis of race

deprives individuals of equal opportunities for education. Recently the California State Supreme Court ruled in Serrano v. Priest that the education of a child no longer can be a function of the wealth of his parents and neighbors, but must be a function of the wealth of the state as a whole.

Hence, it would appear that the societal demand and the constitutional requirement for greater social efficiency is a strong one. However, social inefficiencies exist aside from the two cases mentioned above. For example, there is ample evidence to indicate that equality of educational opportunity does not exist. The poor are disadvantaged in terms of school inputs and those services (health, food, etc.) complementary to the school experience. This condition has been documented by Sexton [1961] and by Guthrie, et. al. [1971].

Another apparent social inefficiency not yet adequately investigated is explained in the argument that the primary function of institutions of higher education may be to certify members of the middle and upper-middle classes as being "better" than members of lower socio-economic groups who do not have the opportunity or the requisite secondary school credentials to obtain higher education. The tests used to track students in high school and the tests used to determine college entrance have been criticized as being culturally biased against minorities and low socio-economic groups. It would appear likely that unless reforms are made in this area the matter may again be taken to the courts.

ORGANIZATION OF THE REPORT

In the following pages we discuss some impediments to the realization of economic, technological and social efficiencies. We also make proposals for research which might alleviate these impediments and which appear to fall within the purview of responsibilities assigned to the NIE.

If research is assumed to be dichotomous, either basic or applied, our emphasis is on the latter category. We do, however, make a couple of suggestions for research which appears to be basic to the solution of some suggested impediments, but which in and of itself does not promise policy implications.

Our proposals fall into two categories: for academic research and proposals for experimentation. Often we offer both sorts of proposals as alternative approaches to a common problem, sometimes linking them together in single possible project.

The obstacles to efficiency which we consider have already been suggested in the above paragraphs. Below we discuss the impediments in greater detail. For each impediment or obstacle to the achievement of efficiency, we discuss why the obstacle is a problem and what kinds of research have been done or are currently being undertaken with respect to the problem. We then propose new kinds of research or experimentation which might provide policy-makers guidelines for

reducing the obstacles to efficiency. We attempt to describe each research idea in some detail, including preliminary estimates on the costs and pay-off periods involved.

In Section II we discuss the impediments to economic efficiency and present our research proposals to alleviate the problems. We follow a similar format with respect to technological efficiency in Section III and social efficiency in Section IV. It should be noted that some research projects do not fit neatly into a single category. For example, a school information system at the local level would not only increase economic efficiency by providing parents with more information about what the school is doing and what it is trying to do, it would also improve technological efficiency by providing local decision-makers with information about the performance of specific schools and teachers.

While all our research proposals are of high priority to us, we realize the NIE can fund in the next fiscal year only a small number of such projects. Consequently, in Section V we have tried to coordinate our proposals and indicate which research items are of the highest priority.

II. ECONOMIC EFFICIENCY

As defined earlier, economic participation efficiency concerns the closeness of fit between the outputs supplied by the schools and those demanded by the consumers of educational outputs. In any market or non-market situation, the consumer can exert an influence on the goods and services he receives only through some sort of participation. In the market place, this participation takes the form of cash which is exchanged for private goods. In the non-market economy, this participation takes the form of voting, court action, or volunteer parent participant groups.

There is abundant evidence that part of the cause of economic inefficiency in the educational sector is the lack of means by which parents and students can participate in educational decision-making. That the need for participation is not being met is indicated by the growth of alternative schools, the migration of upper middle-class families from the cities to the suburbs, and the increasing popularity of schemes to privatize education (e.g., vouchers). The above facts indicate that parental participation is lacking; the fact that the proportion of students dropping-out of secondary schools in poverty areas remains very high indicates that these students and their parents are not able to participate to any substantial degree in educational decision-making and, hence, do not receive the bundle of outputs they desire.

IMPEDIMENTS TO PARTICIPATION

Two impediments to participation in educational decision-making which we shall investigate here are (i) the lack of information available to parents about the objectives and outputs of schools and how well the schools do in attaining their objectives, and (ii) the unresponsiveness on the part of large bureaucracies towards the people they serve. This unresponsiveness is rarely intentional but a reflection of the extreme difficulty of serving many different constituencies especially those more poorly represented student-parent organizations than are middle-class parents.

The lack of good information is a deterrent to parental interest as well as the quality of their participation. That parents lack information about school objectives, outputs, and performance is not surprising. School administrators and teachers in general lack this information, too. Indeed the kind of information required for parental participation is also needed in order to assess the internal efficiency of a school.

The kind of information required to encourage intelligent parental participation is not very different from that which would be necessary to run the schools on a free market basis. The information required by a voucher system is discussed by Jencks [1970].

While good information is an important resource for facilitating parental participation in educational decision-making, it cannot assure

their satisfaction. The inability of large bureaucratic educational institutions to satisfy all constituents has become a more obvious problem as minority groups become increasingly disenchanted with the educational system of the middle class. Benson [1971] has studied this phenomenon and suggested several alternatives to the present institutional apparatus in education.

RESEARCH PROPOSALS

We propose three research topics addressed to the solution of the problems discussed above.

(1) Our first proposal is a survey of the existing alternative schools to indicate what needs are being satisfied there that are not presently accommodated in the public schools.

(2) Second, we propose that the NIE research the feasability of different school information systems which could give feedback to parents, teachers, and policy-makers about the effectiveness of such schools. (See Section III of this proposal.)

(3) Our third proposal is that the NIE research and help inpelment in selected large city school districts alternative schemes to decentralize decision-making and provide parents and students with greater opportunity to participate in formulating the objectives of the schools.

These suggestions are not unrelated to a proposal developed in a later section of this paper. In order to assess what is different about alternative schools or provide information to parents on the outputs of educational institutions, we must first be able to specify and measure the outputs of education.

Below we discuss two of these proposals in detail, discussing what research is currently under way in each area and suggesting what, specifically, the NIE might attempt to do in fostering effective and informed parental participation in educational decision-making.

Proposal for Studying Alternatives Within and Outside the School System: Alternative Schools and Ethnic Study Programs

The Problem

Conventional public and parochial schools have been largely indifferent or even hostile to racial, ethnic, and linguistic plurality in the U.S. Traditionally the school system has sought the "Americanization" of young people to enable them to pursue successfully conventionally defined and accepted goals. One result has been that the dominant school system is largely traditional and inflexible at a time when flexibility, adaptability and innovation are demanded. Further, the same school system which tried to prepare children for life did so largely through curricula and school activities prescribed by student authorities, with

little or no opportunity for student or parental input. These schools, on the whole, require students to adjust to them. They ordinarily cannot respond to new needs for ethnic diversity nor fully accommodate children with exceptional abilities, handicaps or aspirations.

We suggest that NIE examine some alternatives for education within and outside the state system. Such alternatives might include: (1) alternatives within the system such as the coordination and evaluation of ethnic and multi-ethnic programs, and (2) the alternative for education outside the state school or established church schools. The second suggestion is for a study of the development and maintenance of data on the so-called "alternative schools." The paragraphs below address themselves to study of the alternative schools.

Alternative Schools

Alternative schools as used in this research suggestion are schools based on life styles which are seen as alternatives to many conventional American values. To be successful in their own terms, these schools should not need to be dependent upon institutionalized religious, philosophical or political bodies, in short, they should not be in a position of advocacy toward any particular doctrine or cause.

Ordinarily, they are more concerned with emotional development at the expense of conventional "academics." There exists in this

country an alternative school movement of increasing importance and having, according to Jacques Goldman of the Educational Switchboard, San Francisco, a probable magnitude of seven or eight hundred schools.

Objective of the Research

Since one serious difficulty confronting public and parochial schools is the absence of anything approaching concensus on the matter of purpose, there are almost insuperable obstacles for such institutions to assess their own performance. Without periodical evaluation of its efforts, an institution will find it difficult to adapt to changing conditions in a rational manner and to absorb new knowledge or techniques to achieve its goals. It will be hard-pressed to defend itself against those seeking to subvert it.

In consequence of the above, we argue that an important objective is the development of various rationales for alternative schools. Evaluation is no panacea, i.e., it cannot remedy problems of an inadequate finance base. But a large number of persons, parents, students, teachers, both alternative and conventional schools, yes, even bureaucrats of the school system, could benefit from the availability of information on the aims of particular alternative schools and how well they are succeeding. In short, we propose here a study of the alternative school movement, chiefly their purposes -- presumably those needs which are not currently met through

state education -- and their success in meeting these goals. For example, we propose that each school develop its own statement of purpose and criteria for measuring success in achieving these purposes. In any event, these schools should be encouraged to evaluate themselves.

A second reason for trying to develop more formal criteria for evaluating alternative schools is to find an appropriate place for such schools in the spectrum of American education. They may be a vanguard for real educational change, or they may provide the services of political third parties in bringing attention to needs not currently served by the public school system, thereby enabling the state system to coopt their goals for greater diversity and satisfaction to its constituents.

Other Research on Alternative Schools

Unfortunately, no systematic effort has been made to evaluate or even to collect information on alternative schools. There has been no research in the academic sense of the term. The reports which do exist in a number of educational journals are cursory, focus on a particular school, and are likely to have been written in the current evaluative vacuum with respect to criteria for examining such schools. A.S. Neill's classic, Summerhill, a description of a British alternative, is as good a

place as any to begin.*

The Research Strategy

1. A small number of people from a few alternative schools and education switchboards should be assembled to develop in conjunction with the researchers a set of evaluative criteria for the schools and an outline or list of specific items of information to be obtained. These latter would include basic data on parent, student, and teacher characteristics; age, location, and size of the school; amount of tuition; other sources of income; special facilities; etc.

2. Alternative schools and education switchboards would be paid (perhaps a thousand dollars to develop their own individual

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*Further reading:

1. This Magazine is about Schools," 56 Explanade St. East, Suite 101, Toronto 215, Ontario, Canada.
2. This Book is about Schools, Satu Repo, ed.; Pantheon.
3. The New School of Education Journal, 4304 Tolman Hall University of California, Berkeley, continuing publication.
4. Rasberry Exercises: How to Start Your Own School (And Make a Book), Salli Rasberry; self-published.
5. Summerhill, A.S. Neill; Hart.
6. The New Schools Network: 3039 Deakin Street, Berkeley.
7. Smith, Joshua, "Free Schools, Pandora's Box," Educational Leadership, February 1971, pp. 464-468.

evaluative criteria and to evaluate themselves on that basis. They would also be asked as part of their written (and possibly taped or filmed) reports to respond to the criteria established in step (1) and to provide the specific information requested.

3. The researchers would develop a sample of the schools for the purpose of visiting and interviewing at a minimum. Perhaps a smaller sample (one school per researcher?) could be chosen with the idea of having researchers live in the school community or with the school people and work in that particular school for a month or more.

4. After the data had been collected, compiled, and analyzed, each participating school and public school authorities in that area would be given a copy of the report. Procedures would also be developed for keeping the information current, making it readily available, and providing for on-going evaluation. At that time, it would be appropriate to develop plans for longitudinal studies of alternative schools and their students.

Ethnic Programs

Social integration which promotes cultural pluralism has been hindered by conflicts between ethnic groups and the lingering racism in educational and social institutions, U.S. Riot Commission [1968],

Silberman [1964], Steiner [1969], Glazer and Moynihan [1963]. There is also evidence to suggest that the greater the ethnic and class heterogeneity, the greater the conflict in school board meetings and similar arenas, Minar [in Cahill, 1964], Rogers [1968], Berube and Gittell [1969]. A prominent result has been the demand for the inclusion of racial identity programs in colleges and public schools (and for community control of these schools) initially by black groups, but increasingly by other ethnic groups as well. Few institutions presently are able to meet this new demand. For example, the Berkeley, California Unified School District, national leader in school desegregation, finds that the elimination of institutional racism requires further program and commitment. Consequently, the promotion of experimental schools with culturally diverse programs to promote positive racial identity now has a high priority, Berkeley Unified School District [1971].

There is inadequate support in terms of resource persons and guidelines from research for even those groups or institutions wishing to undertake multi-ethnic or ethnic studies programs. The resources are scattered, segmented, and duplicated. Legislation to improve intergroup programs appears, for example, in Title IV of the Civil Rights Act, Title I of E.S.E.A., and in N.D.E.A. Ethnic studies centers are being funded by N.D.E.A., Title VI, the Far West Regional Laboratory is studying multi-ethnic education, as is the Multi-Cultural

Institute of San Francisco. A host of universities have a commitment to Afro-American Studies: Atlanta University's Institute of the Black World, Howard University, Yale, Harvard, University of California at Berkeley, Columbia Teacher's College, to name a few. To link research with practice, the logical output might be to provide in-service training for teachers and programs in segregated areas, especially those places likely to have few or no ethnic programs.

Research Proposal

We suggest the following:

1. That the NIE identify and evaluate the existing resources (people, research, programs) in both the private and public sector through a centralized agency whose aim would be to develop and promote resources for programs in multi-ethnic and ethnic programs.

2. Further, that through this agency or other means, the NIE devise methods of coordinating fruitful collaboration between persons teaching, researching or initiating programs in this field to discover where the efforts are duplicated or not yet directed.

3. That the coordinating agency itself or some delegated groups act as consultants to provide experts, research, multi-ethnic media texts, etc., for schools wishing to move with confidence and competence to multi-ethnic and ethnic programs. The results from this agency's research and collaboration should be tested in an inner city segregated

school with a staff of teachers who have exhibited great skill in teaching such children.

4. Finally, that the NIE itself support and encourage research in three areas: (a) Teacher-student interaction and school environment, (b) research on text books and other teaching materials, and (c) multi-ethnic and ethnic creative arts program.

Important background material for research area (a) documenting the problems of student image and the self-prophecy for student failure is discussed in Jablonsky [1970], Becker [1952], Clark [1965], Sexton [1964], St. John [1970].

Research pertinent for the inquiry of the influence of textbooks and other teaching materials is incomplete. Especially is there little work done on the differential effect of similar texts on a variety of ethnic groups. Nonetheless, even a cursory survey would include Marvick [1965], Vogel [1968], Patterson [1971], Cook [1966], Nails [1970].

Much of the research to substantiate the need for multi-ethnic and ethnic creative expression is indirect. A Yale Seminar on Music in the public schools admitted failure in the urban areas, O. E. Bulletin [1964]. However, an account of the success using Greek mythology to encourage Harlem youngsters to write creatively whatever suggests that the results are at least mixed, Kohl [1967]. This same teacher

has used funds from the Carnegie Corporation to provide a multi-ethnic creative arts program for a private alternative school, Other Ways. He reports that in his opinion the use of famous black, Chicano, Puerto Rican musicians, writers and poets did indeed inspire creativity. A small recommendation one might make parenthetically is that NIE develop consortia of multi-ethnic resource people in the creative arts to provide programs on a regional basis and to assist in the development of multi-ethnic media.

Proposal for Research and Experiments in Decentralized Decision Making

A variety of social and economic forces have been at work in the last two decades to bring about greater centralization of decision making in education. For example, the number of school districts has been reduced from over 100,000 to less than 20,000 today. This reduction has occurred at the same time that the United States has experienced an awesome increase in the number of pupils enrolled. A consequence of these two conditions is that there are many more heavily populated school districts than ever before and each individual school board member now must represent many more constituents than was the case previously.

The reduction in the amount of representation has taken place simultaneously with the growth of "professionalism" among

educators and their organizations. A concommitant of such "professionalization" is an ethic which communicates a "hands off" attitude to the public. We, the professionals, have the expertise and we are the best qualified to make school related decisions. A consequence of this attitude has been to push laymen further and further into the background with regard to educational decision making. This has particularly been the case in big cities where the problem becomes intensified by conflicts between professional educators and minority groups. The latter have viewed their exclusion from the decision-making arena as another example of racial and ethnic group discrimination. Thus, it is somewhat understandable as to why the most adamant demands for "community control" have come from minority groups in the big city school systems.

A second illustration of the trend toward greater centralization of educational decision making comes from the area of school finance. In almost every state, there exists wide disparities between local school districts in their average annual expenditures per student. Court actions such as the previously mentioned Serrano case now threaten to declare such expenditure disparities unconstitutional. A new principle of equity is evolving: "the quality of a child's education cannot be a function of his parent's or neighbor's wealth, but may be a function only of the wealth of the state as a whole." Meeting this principle will necessitate a greatly expanded state role in school financing. This expansion carries the possibility of elevating many school-related decisions--not just decisions

about dollars--from local districts to the state capitol. All of this is occurring at a time when there is a growing feeling that all government, not just school government, is too distant from those it is supposed to serve. If the desire for financial equity and efficiency on one hand are to be meshed with the desire for greater public participation on the other, then we must develop governmental arrangements which allocate decisions to their most appropriate level. We need a new model which simultaneously permits financial allocations to be decided at the state level while many decisions about personnel, curriculum, and school structure can be made by local participants.

Specific Research Proposals

In order to develop the new governance models called for in the foregoing section, we wish to propose specific experiments and research studies.

Parent Choice. One extreme form of decentralized school governance is to place decision making in the hands of parents. One mechanism for accomplishing this purpose is to finance schooling through vouchers or school stamps. Thereafter, presumably, the market mechanism would be triggered by parent choices, which would produce a schooling system more responsive to the desires of its clients. This approach, though fraught with political and, perhaps, legal problems, is, nevertheless, worthy of limited experimentation. Another approach, and one which we believe to be politically more plausible in the long run, is to allow parent choice but

relatively small cluster of schools. By so doing it would appear that logistical problems such as transportation are minimized. Consequently, we recommend that NIE foster the development of several parent choice plans in different geographic and demographic settings to assess the impact of this modified market mechanism upon the decision making process. The basic proposition to be tested is whether or not expanded client choice satisfies the desire for added local level participation and greater organizational responsiveness.

Parent Participation. A modification of the above-mentioned parent choice plan is to arrange for each individual school to have a parent advisory council (PAC). The primary function of such bodies would be to select and thereafter advise the school principal about matters such as discipline, curriculum, personnel selection, and instructional modes. A few school systems are now embarked on Parent Advisory Council plans. However, few, if any, of these are being designed with systematic assessment of their outcomes as a goal.

Local Level Information System. Decentralized decision making and greater local participation would be aided by the availability of more information about the characteristics and performance of local schools. Neither parents nor administrators can make adequate decision in the absence of information about what schools are like and which schools do and do not teach children. However, to date we have never had a systematic

examination of (1) what kinds of data would be useful for greater decentralized decision making, and (2) what form it should take so as to be useful to school clients and administrators. Consequently, we propose that NIE conduct such information systems research.

Alternative Schools. In another section we discuss the growth and possible advantages of so-called alternative schools. Our point in mentioning them here is to emphasize the fact that, in some measure, such schools have come about because they satisfied a desire on the part of their client to participate more closely in the making of decisions about their children's schooling. Consequently, it appears as if an examination of alternative schools, particularly the motives and satisfaction levels of their clients, would assist in constructing decentralized decision-making models for education. We recommend that the NIE conduct such an examination.

EXTERNAL EFFICIENCY

One component of social efficiency is the matching of the supply of educational outputs with the demands by the immediate consumer (or investors) of those outputs--parents and students. Another component of social efficiency is the matching of the supply of educational outputs or, more precisely, labor skills with the demand for those outputs by the employers of labor. We label this component "external efficiency" to differentiate it from "internal efficiency" which relates to how cost-effective the educational system is in achieving its objectives.

That external inefficiency or educational waste exists within the present system is evidenced by the large numbers of hard core unemployed, the unemployed or underemployed highly educated (e. g., aeronautical engineers), and the highly educated whose skills have become obsolescent. In other words, the present system does not precisely produce the skills required by the economy; it may produce too many teachers while it is producing too few doctors. At present the problem of underemployment is most acute for teachers, engineers, and some kinds of new Ph. D. 's. Wolfle and Kidd [1971] describe several predictions that the supply of new Ph. D. 's will outpace the number of facancies in the kinds of employment traditionally done by new Ph. D. 's for at least the next decade.

The social goal of external efficiency is closely connected to the individual need for work which gives psychic satisfaction. We postulate that unemployed or underemployed individuals are not satisfied with their work.

Impediments to External Efficiency

The impediments to external efficiency are several. Currently there is no national manpower planning to predict demands for and influence the supply of educated manpower. However, we neither favor nor propose the establishment of comprehensive rigid manpower planning; indeed this function may not fall within the responsibilities of the NIE. On the other hand, the present system could operate much more efficiently if more

information were available to both public and private educational investors about the rate of return to expect on their investments, the probabilities of employment in specific occupations, the income levels to expect for specific skills, etc. In addition, the system would work better if the skills individuals receive enabled them to be more flexible so as to be able to change occupations or update skills quickly. However, the main impediment to the attainment of external efficiency in education is the lack of informarion about current and future employment conditions.

RESEARCH PROPOSALS

We make a single proposal for a system of decentralized manpower planning which would increase the information flow to the private and public investors in education (higher education) and thereby promote external efficiency of the educational system. This proposal consists of several alternative research strategies and is discussed in greater detail below.

A Proposal for Decentralized Manpower Planning

The Problem

Our educational system is not externally efficient; the question then is, what can the NIE do to improve the matching of skills demanded by the economy with skills supplied by the educational sector? Formal manpower planning is best undertakin in a centralized educational system and is largely

inappropriate for the United States; also, most planning has been undertaken in developing countries, for which it may be easier to project future manpower needs. Benson [1971] has discussed the appropriateness of using manpower planning for the U. S. economy.

However, the system can be made to operate with less waste without instituting a formal program of manpower planning. If those public and private entities investing in education simply had more information with which to make their decisions, external efficiency would be improved. Hence, this is the specific problem which we address, how the NIE can provide investors with the information with which to make informed, rational decisions. We label our answer, decentralized manpower planning.

Objective

The objective of our proposal is to generate the information required by public and private educational investors. We suggest alternative means which might be employed to achieve this objective.

Research on the Problem

Most economic research on this problem has centered around the estimation of private and social rates of return to those entities investing in education. Considerable research has been done estimating rates of return for different occupations and educational levels (e. g., Becker [1964]

Weisbrod [1962], and Hansen [1963]). However, as argued by Blaug [1968] and Eckhaus [1963], there are many problems in estimating and believing these rates of return calculations.

Knowledge of the private and social rates of return would be useful for making private and social educational investment decisions, which would alleviate the problem discussed above. That is, private and public investors could be expected to seek the highest rate of return, which would bring about an equality of rates of return for different types of educational investments. However, as pointed out by Michaelson [1969], it is likely that other types of information would be needed in addition to information about rates of return in order to make wise investment decisions. For example, some individuals may seek a target consumption level and, hence, desire knowledge about absolute income levels. Also, the probability of employment in a given field is as important as the rate of return to those individuals who obtain employment in that field.

A alternative to the rate-of-return approach is favored by Eckhaus; that approach is to estimate the supply and demand functions for recent graduates of educational institutions. From such information one could more accurately predict the income levels, rates of return, and probabilities of employment for graduates of specific training programs in the near future.

Research Strategies

The research strategy suggested by Eckhaus--estimating the supply and demand schedules for graduates having different skills--requires a large body of information not now in existance. For example, information would have to be gathered on the educational programs and employment records of large numbers of graduates.

We suggest an alternative strategy, which would, however, facilitate the estimation of supply and demand schedules. The NIE could sponsor "follow-up" studies in several educational institutions (most likely institutions of higher education) to determine what happens to the graduates of those institutions over a period of, say, five years after leaving the school. The NIE might wish to follow only a random sample of students in different programs. From this information, supply and demand schedules could be estimated for individuals embodying different skills and attending institutions of differing qualities. Also, rates of return, income levels, and the probability of employment in a given occupation could be calculated. If in addition, regional or national educational flow models existed, the NIE could quite accurately predict the future supply of manpower with any given skill and, then, knowing the demand and supply functions, be able to predict income levels, etc. for those students just entering school or making career decisions. The educational flow model required need not discuss the development of an educational flow model of the sort which would be useful for the U. S.

Cost and Payoff

The cost of this proposal would, of course, be dependent on which parts of the proposal were adopted. An educational flow model might be fairly inexpensive as most institutions of higher education already collect the required information, and some of this information is aggregated by the National Center for Educational Statistics.

The cost of follow-up studies is clearly a function of sample size, number of institutions surveyed, and the quantity of information collected. Two alternatives could be followed in collecting the data: (1) the NIE could collect information on recent graduates of different institutions or (2) the NIE could subsidize institutions to follow-up the students they have at present. The second alternative may provide more complete information but is also more likely to have a longer lag before payoff.

The time required to collect and analyze the information is also a function of the complexity of the study. Initial results may not appear for two or more years, but if the follow-up operation were continuous, the lag would be very short and investors making decisions could utilize the most up-to-date information possible.

III. TECHNOLOGICAL EFFICIENCY

Technological efficiency or "internal efficiency" relates to how cost-effective the schools are in producing educational outputs. At present we do not know what distinguishes a technologically efficient institution from a technologically inefficient one. It is important to discover which inputs contribute to learning because fiscal constraints on school districts are becoming tighter and, furthermore, because effective compensatory education programs require this knowledge as a basis for action. As stated by President Nixon, "Until we know why education works when it is successful, we can know little about what makes it fail when it is unsuccessful. This is knowledge that must precede any rational attempt to provide our every student with the best possible education."

Because the President's speech calling for a National Institute of Education put major emphasis on research and experimentation to determine what makes children learn, the Berkeley report has put its emphasis on proposals to increase this knowledge and thereby improve technological efficiency.

IMPEDIMENTS TO TECHNOLOGICAL EFFICIENCY

There are many impediments to technological efficiency. They can all be conveniently summarized into two broad statements: We

do not know what makes children learn and we do not know what it is that children are learning. As any economist knows, in order to have technological efficiency (where the ratios of marginal products to input prices are equal for all inputs) the institution must attempt to maximize an output(s) subject to the resource constraint. However, since we do not know how to identify and measure the outputs of education, it is a bit difficult to specify what it is that a school should attempt to maximize. We can, of course, take a standardized achievement test as a measure of what students learn. However, even if we assume this to be an adequate proxy for learning and assume that this is what schools attempt to maximize, the state of the art is such that we have not been able to tell whether one institution is following a more efficient technology (in terms of being able to get more output from the same inputs) than another.

It is not very helpful to continue talking about these overall impediments to technological efficiency; we attempt to more precisely specify some of the impediments to efficiency which the NIE might wish to attempt to eliminate.

One impediment is the faculty reward system in elementary and secondary education. There is evidence to indicate that teachers are not rewarded in accordance with their productivity, using standardized verbal test scores as the measure of output. Levin [1970b] found this to be the case in a reexamination of the Coleman data; Winkler [1971]

independently found this to also be true for a school district in Northern California. In other words, there is little evidence to indicate that teacher experience or teacher credits beyond the B.A. degree actually make the teacher more effective, yet it is on these grounds that teachers are most often rewarded. Our research proposals in this area are (i) that the NIE finance the analysis of production functions in education in an attempt to improve upon the work of Levin and Winkler, and (ii) that the NIE experiment with alternative teacher reward schemes, attempting to tie rewards more closely to gains in output (verbal achievement).

One difficulty in rewarding teachers in accordance with their productivity on an operational basis is that it is difficult to monitor their performance and measure their output. Once output measures are chosen, however, it is feasible to monitor teacher performance by the use of a local school information system. We develop this proposal in more detail later in this section.

Another impediment to technological efficiency is the ineffective use of student and teacher time. Part of the problem is that student time is regarded as a "free good," but in reality student time may be the most important input to the learning process and should be allocated most carefully. A question of special urgency is whether children, especially those living in urban slums, might not gain more from school activity during the summer than they do from their vacation. We propose

that the NIE experiment with different uses of student time in the classroom and finance summer school operations for all grades on an experimental basis.

We mentioned above that at present we do not know which schools are efficient nor do we know what makes a school inefficient. While production function studies such as the Coleman Report [1966] have attempted to find school characteristics highly correlated with student verbal achievement, these attempts have been subject to intense criticism. We propose that the NIE attempt to assess the efficiency of select high schools and colleges by attempting to control for student background and then doing a survey of graduates, focusing on their economic success (income, occupation, etc.) and personal happiness (incidence of unemployment, mental disorders, divorces, etc.). We also propose that the NIE sponsor the development on an experimental basis of local school information systems to give local districts information as to which schools or teachers are most productive.

A final impediment to technological efficiency which we consider is the current state of ignorance about the identification and measurement of educational outputs. We propose that research involving social scientists of many disciplines be undertaken to attempt to identify and measure the outputs of the educational system. Research on this question would appear to be basic for it affects every other research proposal

which we suggest regarding the optimal allocation of school resources. For example, it influences what we use as effecitveness criteria when deciding the productivity of a teacher or an institution. Because the research proposed in basic, it is difficult and likely to have a long pay-off period. Hence, while we propose that the NIE sponsor research to identify and measure outputs at all levels of education, other research should not be delayed.

RESEARCH PROPOSALS

We have already mentioned the proposals we make to remove the impediments to technological efficiency. For clarity of exposition, we simply restate the list of proposals before discussing each in detail. We have proposed that the NIE sponsor the following activities:

(i) an analysis of educational production, using comprehensive and longitudinal data;

(ii) experimentation with alternative teacher reward mechanisms;

(iii) experimentation with different uses of student time, within the classroom and during the summer months;

(iv) attempt to identify efficient institutions and classrooms and ascertain which characteristics make them efficient;

(v) study and experiment with the tradeoffs between physical and human capital;

(vi) inter-disciplinary research to identify and measure educational outputs;

(vii) develop and maintain a federally-sponsored research school, which has close affiliation with the NIE.

A Proposal for the Analysis of Education Production

The Problem

Little is known about how efficiently school resources are allocated in the educational sector. Also, relatively little is known about how the school can be used to improve the educational achievement of children from educationally deprived backgrounds. The latter problem is the more important one as demonstrated by the vast amount of literature in the area (see Coleman [1966] and Sexton [1961]). This ignorance is clearly an impediment to the attainment of techrological efficiency.

Studies of educational production functions are useful in estimating the marginal products of various school inputs, in determining which characteristics of teachers are important for learning, and in assessing which compensatory education programs would be most effective. Unfortunately, studies undertaken to date have been seriously hampered by the lack of comprehensive and longitudinal data. This is the problem to which this research proposal is addressed. How can the NIE provide the requisite data for studies of educational production which may provide solutions to the impediment of ignorance?

Objective

The objective of this research proposal is the provision of data with which to attempt to find effective compensatory education programs and productivity-related reward mechanisms for teachers. It should

be noted that this proposal nicely complements the programs for experimentation with teacher incentive mechanisms suggested in the following proposal.

Research on the Problem

There have been many attempts at estimating educational production functions; two studies indicative of these efforts are by Burkhead [1967] and Hanushek [1968]. However, as pointed out by Bowles [1970] and Levin [1971], there have been serious problems limiting the success of these studies. One problem has been the lack of longitudinal data; researchers have been forced to assume that past school resources are unimportant or are identical to school resources currently received by the student. Another problem has been the superficiality of the data--few studies have collected comprehensive information about teacher characteristics, peer group characteristics, etc. Finally, it has not always been clear that the schools attempt to maximize precisely those items which researchers consider to be outputs.

Research Strategies

Studies of educational production may yet prove immensely useful if adequate data becomes available. We propose two research strategies to generate the needed data. Our first proposal would provide the highest quality data--but at the expense of a long gestation period before results could be obtained. We propose that the NIE collect

comprehensive, longitudinal, data on a student, his family, and his school beginning in the pre-school years and continuing through the end of formal education. To justify such a large investment in time, the data should be so comprehensive as to enable the testing of hypotheses and theories of many kinds of scientists. Such data could provide insights into the learning process which are otherwise unobtainable. (For example, where in a child's life is an increment of school resources most effective in terms of some output measured at the end of schooling?)

Our second proposal for data generation has a much shorter gestation period and, hence, is undoubtedly more politically palatable to a government agency. We propose that the NIE collect data on a national cross-section of students. The data should be very comprehensive and much effort should be put into reconstructing the longitudinal record of achievement and school and home environments experienced by the student. The sample size should be relatively small (not more than 10,000) such that the information collected is not superficial. Some of the students may include a sample of students from experimental schools now funded by OE; as those schools have carefully specified their objectives and their teaching technologies, it would be very interesting to compare their results with more traditional schools.

Cost and Payoff

As we regard acceptance of the first research proposal to be unlikely, we provide cost and time estimates for the second proposal only.

The cost of collecting data on a cross-section of students will clearly be a function of the sample size and the nature of the data to be collected. We suggest that the NIE not rely upon the school to supply the data but, instead, go to the school and the family and collect the data itself.

The time required to collect the data will in part be a function of the number of personnel working on the project and the size of the sample. We estimate that the sample could be chosen and the data collected and processed in less than two years.

Proposal for Experimentation with Teacher Reward Mechanisms

Rationale

We presently rely on three means by which the student acquires formal educational experience to digest: environment, technology, and the teacher. The environment of the school offers "discoveries" from which the student, self-directed, may learn. Learning through technological methodology is other-directed. The student does as the teaching machine or media directs. Order and depth of exposure is predetermined. The teacher should afford a combination of student self-directed learning and other-directed learning. The advantage of a teacher is his ability to provide teaching techniques not offered through the environment or technology. Ideally, this would be the proper mix of individualized and group instruction appropriate to each student's learning

potential. Since we have not yet decided to eliminate the teacher from teaching, it is desirable to improve the quality of education delivered by teachers. One way to do this is to improve the quality of teachers through a more effective incentive system.

Impediments

1. Rewards. Current incentives must be changed. We presently provide no incentive or reward for excellence. Rewarding tenure and acquisition of units encourages people to stay in teaching and to invest money in nearby colleges or universities. It fails to encourage a higher level of expertise; units may be unrelated to what the teacher needs to know to become a better teacher. The value of experience acquired over time is dependent on the quality of events composing the experience, not the duration. In addition, the present reward system equates "success" with administration. We need an incentive for excellence in the classroom.

2. Present Procedures of Role Definition Within the Teaching Profession. Unlike other professions, we have little provision for differentiation of responsibility assumed in the teaching process. Some teachers would like the career potential of specializing in an area of the educational process, such as a lab teacher or a diagnostician; others would like the possibility of progressive levels of teaching responsibility coupled with a multiple salary schedule. Clearly, we must move toward an increased level of professionalism. Education must adopt the goal of professional

quality.

Research Strategies

1. Incentive I -- Salary Structure. Design, implement, and evaluate the effect of alternative salary structures. Salary can be a powerful incentive system if it is rewarded in a manner that requires quality. The single salary schedule does not attract nor hold excellent teachers. A salary schedule should be based on analysis of the needs of the educational system and the data collected on the present and potential teaching force.

Attachment A is an exemplary schedule designed to encourage self-directed continuing education; for example, work in related fields and research based on implementation of new curriculum. It is important that teachers be able to relate the research results generated by NIE to the teaching situation.

2. Incentive II -- Role Differentiation. Through differentiation of teaching roles/responsibility and through a differentiated pay scale, we could reward teachers in accord with responsibility. In addition, a bonus could be offered those who are able to generate specified student achievement. (See Recommendation 1, page 2.)

NIE could evaluate success of current Differentiated Staffing programs under EPDA. Steps could be taken to remove current impediments to success of these programs. Model programs could be funded, perhaps through the Research School. (See page 58 of this paper.)

3. Incentive III -- Leadership Training. The quality of teacher organization leadership has a direct relation to the reward/incentive system offered to teachers. In any group the behavior of a few may influence many. The teaching profession could profit from the presence of a few "philosopher kings." At this time, teacher organizations demand a more active role in the decision-making process. (See section II, participation. The components listed on page 9 are appropriate here.) Teacher organizations should influence the incentive system and the level of expertise it is intended to generate.

a) Research the changing political patterns and personnel composition of teaching organization,

b) Simultaneously fund a training program for educational leaders in teacher organizations. The program should address policy-making procedure on Federal, state, and local levels.

4. Incentive IV -- Recommendations 1 and 2 address those who have entered the teaching profession through the present credential gate. It would also be advisable to:

a) Spark the credentialed force with outside talent. Professionals in fields other than education should be permitted to teach part-time in a public school if they so desire. This could be on a volunteer or paid basis. For example, a research scientist could provide a supplementary science lesson each week. A local artist could teach the use of media with which the teacher

is unfamiliar, as well as providing a link to future jobs and current institutional resources such as a museum or university.

b) Reexamine current credentialing practices. (An NIE research school would afford an excellent opportunity for the above. See the last proposal in this section.)

We have not begun to utilize an incentive system. Incentives that attract appropriate credentialed personnel, non-education professionals, and non-education non-professionals should be developed. In addition, we should provide means for professional growth and progression within the teaching profession. This could be by differentiation of roles within the teaching profession as well as by permitting mobility between roles.

ATTACHMENT A

EXEMPLARY INCENTIVE SALARY SCHEDULE

I. Training. Annual base salary is related to the training of the teacher. Per cent figures refer to per cent of theoretical maximum income, $50,000 annually.**

	B.A.	+ 30 units	M.A.	+ 15 units	+ 30 units	Ph.D.
Base salary	$ 7,000	8,000	9,000	10,000	12,000	15,000
Per cent of potential maximum	% 14	16	18	20	24	30

II. Experience. Combinations of in-school and extramural teaching related experience may account for as much as 30% of the theoretical maximum income.

Intramural experience years	Dollar Value	Per Cent of Maximum
1	$ 750.00	% 1.5
2	1500.00	3.0
3	2250.00	4.5
4	3000.00	6.0
5	3750.00	7.5
6	4500.00	9.0
7	5250.00	10.5
8	6000.00	12
9	6750.00	13.5
10	7500.00	15

* Precise dollar amounts need to be flexible in a labile economy. The amount should be considered less relevant than the per centage figures. The range of incomes is emphasized.

(Attachment A cont'd.)

Intramural Experience	Dollar Value	Per Cent of Maximum
One school, one subject	$1250.00	% 2.5
One school, two subjects	2500.00	5.0
Two schools, one subject	3750.00	7.5
Two schools, two subjects	5000.00	10
Extramural Experience *		
Job in business related to major teaching field	1250.00	2.5
Educational job in business related to major field	2500.00	5.0

III. Achievement. Student achievement is measured by controlled testing. Achievement per centages refer to performance above the district mean for that subject for that tract of student. The highest student achievement may account for as much as 30 per cent of the theoretical maximum income.

Student Achievement	Dollar Value	Per Cent
25% of students 2 years above average	$ 5000.00	% 10
50% of students 2 years above average	10,000.00	20
75% or more students 2 years above average	15,000.00	30

* At least one year's experience, independent of school or concurrent. Additive to intramural experience or independent.

(Attachment A cont'd.)

IV. Research. Research productivity may account for as much as 10% of the theoretical maximum salary. Each piece of research will be monitored for quality by the funding foundation or agency at the time of grant issue and again at the time of product submission or article publication. No credit will be given until the research is completed and passed by the funding agency as well as published.

Research*	Dollar Value	Per Cent
One article or product per year	$ 1250.00	2.5
Three articles or products per year	2500.00	5.0
Five or more articles or products per year	5000.00	10.0

* Increment in salary granted for year of productivity only.

Proposal for Experimentation with the Use of Time

The Problem

In the general area of technological efficiency, the problem of a judicious utilization of time in the school remains one of the more complex and understudied of all the variables in the process of education. The question, are the schools efficient in their utilization of time, is very important because, as Thomas [1971] notes, "Education is...a commodity whose cost includes a large time-related element."

First, for example, teacher time becomes increasingly costly as the proportion of the school budget destined for labor continues to rise (a trend that is not expected to end soon). Second, student time involves an opportunity cost measured by the income foregone during their schooling. The time of young children has no market value, but that is not to say it is a variable with a price of zero. Lastly, the non-utilization of fixed capital school equipment and of teacher's professional skills during a large part of the year constitutes a large opportunity cost to society.

There are also several questions relating to the allocation of student time in the learning process of each child. First, is there an optimum allocation and phasing of time particular to different subjects? Second, since children learn at different paces and these paces may differ from subject to subject, is it sensible to submit all children to identical learning schedules?

With respect to all problems one can raise about the utilization of time in the school, our proposal focuses on two: the use of school facilities during the summer months and the use of time within the classroom. Another important area worthy of research is the matter of increasing the efficiency in the utilization of those school resources which are the more time-related (fixed capital and teacher, student, and administrator time). This area, however, is discussed in another proposal in this paper dealing with the tradeoffs between physical and human capital.

Objective

We think that research should aim at (i) evaluating the importance of various patterns of time allocation on the learning process itself and (ii) improving the inner city school childrens' experience by a better utilization of time spent in and outside the schools.

Research on the Problem

An important body of research on time and learning exist in psychology, including the effect of various learning situations on retention, remembrance, etc. Some research on the efficient allocation of time in the teaching of various subject matters was done in the late 1950's and early 1960's, but the trend has been abandoned with the influence of the English schools and their stress on more flexibility in the curriculum.* Unfortunately, it has

*Thanks is due to Professor R. Anderson of the Harvard School of Education for information on past research in this area.

not been replaced by a parallel trend of research on the utilization of time in a more informal setting.

Currently, under the Experimental Schools Program sponsored by the Office of Education, a school district in Pierce County, Washington, is now experimenting with a very flexible schedule where the schools are open twelve hours a day, eleven months a year, with children attending school from 180 to 240 days a year. The experiment relies heavily on quick but careful diagnosis and prescription for a student's needs, one specific goal of the program being to reduce by 75% the number of children working below grade level.

Research Strategies

We propose that the NIE consider conducting two types of research with respect to the problem in question. First, the NIE should sponsor research on the use of time within the classroom, focusing on two points in particular--the effects of regular versus periodic teaching of a subject and the age level at which various subjects are best presented to the students. It is this kind of research which might be undertaken in a new federally-sponsored research school, another of our proposals.

The research might take the form of experimentation, having two groups of students, one experiencing the traditional use of time in the classroom, another experiencing a much more flexible use of time or subject matter introduced as the students become ready for it.

The second type of research we propose is that the NIE measure the effects of summer vacation on student learning, especially in the inner city. To what extent does learning regress over the vacation period? In conjunction with the testing for regression, we propose that the NIE subsidize the year-round operation of elementary schools in some inner city areas and test what effect this has on student achievement.

Cost and Payoff

The payoff period for either of these programs would not be very short. Especially with year-round operation of schools, care should be taken to assure that the operation is allowed to function a couple of years before the short-run results on learning are measured.

A Proposal to Assess Institutional and Classroom Efficiency

The Problem

Before technological efficiency can be attained, we must first know which school inputs are related to learning and how student achievement is affected by incremental increases in those inputs. One method of uncovering this information was suggested earlier in this section. We suggested that comprehensive, longitudinal data be collected on a cross-section of students in order to estimate educational production functions. However, the state of knowledge regarding the learning process is so poor that we do not feel that a single approach will provide all the answers.

To date we have even been able to distinguish the efficient from the inefficient school, nor have we been able to discriminate between the effective and the ineffective teacher. Hence, the specific problem which this proposal confronts is the identification of specific efficient institutions and teachers and the specification of those characteristics peculiar to those entities.

Objective

The objective of our proposal is the identification of efficient schools and teachers and the specification of their characteristics.

Research on the Problem

We are not aware of any research which attempts to identify efficient institutions or effective teachers. Levin [1971] has criticized the work done estimating educational production functions and has presented estimates of his own for only those students on the production frontier. However, no one has actually identified those institutions which have attained a high degree of technological efficiency and subsequently attempted to identify the institutional characteristics which make it so successful.

Research Strategies

We suggest two alternative strategies for identifying efficient institutions. First, we propose that the NIE finance "follow-up" studies of the graduates of a sample of secondary schools and colleges. By

measuring the "success" of graduates in terms of income, occupation, achievement scores, etc. and controlling for the characteristics of the student bodies of such institutions, the efficiency institutions could be identified and further research could be undertaken on the schools in the sample to assess why some institutions are efficient.

Two approaches could be taken with respect to this proposal. The NIE could obtain lists of students who graduated five years ago and attempt to locate those students and measure their current "success." Alternatively, the NIE could subsidize the schools themselves to begin collecting follow-up information on current students. The advantage of the former approach is a short payoff period; the advantage of the latter approach is more comprehensive information and the inclusion in the sample of "unsuccessful" students who might be omitted the first approach.

We do not suggest with respect to either of the above approaches that the NIE collect follow-up information on the entire student body. Rather a random sample of students would be studied for each educational institution. It should also be noted that there are complementarities between this proposal and our earlier proposal for decentralized manpower planning. Indeed it would appear quite feasible to gather the requisite data for both studies from one data-gathering operation.

Whereas the strategy discussed in the above paragraphs would appear most appropriate for assessing institutional efficiency at the secondary school, vocational school, junior college, or college level, the second strategy

which we now discuss is most appropriately applied at the elementary or secondary school level.

The second means of identifying efficient institutions also permits the identification of effective teachers at the elementary school level. The mechanism suggested is a local school information system, which would also provide the kind of information necessary for intelligent parental participation in school decision-making. The local information system could collect information about every teacher and classroom. Controlling for the characteristics of the students in the classroom, the school district could ascertain which teachers were most effective and both reward them accordingly and attempt to duplicate their teaching methods elsewhere in the school.

The local information system would also provide the types of information necessary to compare the efficiency of different educational institutions. Outputs would, however, necessarily be limited to the currently available measures.

The kind of information which a local information system would ideally collect is discussed in a RAND paper by Hanushek and Levin [1969]. The RAND corporation has continued its work in this area resulting in a discussion of multi-level information systems by Coleman and Karweit [1970]. As the Los Angeles school district is considering adopting the information system developed by RAND, the NIE might wish to investigate the success of that program before devising alternative information systems.

Cost and Payoff

The cost is clearly going to be determined by the sample size and the comprehensiveness of the data collected for strategy one. With respect to the second strategy, the cost is a function of the amount of information collected and the number of experiments the NIE wishes to subsidize.

The payoff period could be relatively short for either of these strategies. Much of the preliminary work has already been done on school information systems; experimentation in implementation is needed now.

Proposal for Research in Tradeoffs between Physical and Human Capital

Even when inflation is taken into account, educational per pupil expenditures for the United States have been undergoing rapid increases in the last two decades. In fact, school expenditures have been increasing faster than growth in the Gross National Product. These increases are, of course, all occurring at the same time that the competition for the public sector dollar is becoming extraordinarily keen. In addition to schools, we now have vastly expanded expectations for government support of costs such as welfare, health, and transportation. Consequently, increasing school costs are burdensome, not only because they deprive individual taxpayers of resources they might otherwise spend in the private sector, but also they jeopardize adequate provision of other badly needed public sources.

The major factor accounting for increased educational costs is the expense of employing teachers. This expense has been increasing both because more teachers have been hired relative to the number of pupils enrolled (the teacher-pupil ratio has been declining) and teachers' salaries have been increasing. The latter have, as with educational expenditures generally, risen more rapidly than the inflation rate and the GNP. Thus, unlike many endeavors in the private sector, education appears to be increasingly labor intensive. To date, there has been an almost complete absence of any substitution of technology for human labor in schools. As a consequence, there have been no gains in productivity.

Impediments

There is some debate presently among experts as to how much promise existing technology holds for increasing educational productivity. Ten years ago, many waited expectantly for a school revolution involving teaching machines and computer assisted instruction. No such revolution came. It was not clear that the new technology taught children any more proficiently than could a teacher. Secondly, it was abundantly clear that the costs involved were substantially greater than for teachers.

Technology proponents contend that in order for their new machines to be cost-effective they must undergo a substantial and expensive development phase. After that, there must be a guaranteed market demand for them that will justify the expense in tooling up mass production of these machines.

Finding the development funds and subsequently assembling the coordinated market are two impediments to the achievement of effective technological substitute for human capital in teaching.

Specific Proposals

Because of the spillover of benefits beyond the boundaries of a single school district or a single state, it is economically more sound for the federal government to bear the major burden of development costs for educational technology. Consequently, we recommend that the NIE encourage the establishment of a center for research and development in educational technology. The center would not only have as its function the perfection of instructional technology, but also subsequently would assist in coordinating local school districts so as to generate a sufficiently large market for such products. Also, such a center should concern itself with questions such as which are the best places in the educational process to sbustitute machines, what subjects best lend themselves to technological instruction, and how teachers can be trained to use instructional technology.

It will be noted that this proposal is similar to a proposal we make later for the establishment of a National Research School. The center for research in the application of physical capital to education would be a component of that school.

Proposal to Identify and Measure Educational Outputs

Presently, resource allocations in education--including day-to-day allocations of teacher's effort and student's time within the classroom--are made on the basis of rule of thumb and convention. Given the size of resource commitments in this branch of the public sector, absence of rational criteria is unconscionable. What one should promptly seek is a value-added measure of educational outputs. Such an objective implies field testing of existing readiness measures (the type of test given to children of young ages who have not yet had much formal educational experience). If the readiness tests turn out not to be accurate predictors of early performance in formal education, obviously new readiness measures will have to be designed.

A second objective is to produce criterion-referenced tests at different levels of difficulty in different subject areas. The Center for Study of Evaluation at UCLA is working on this objective, as is the Comprehensive Achievement Monitoring (CAM) Project in the State Education Department, Albany, New York. However, neither group yet has a product to distribute, even though the State of Florida now stands ready to regulate state funds for elementary and secondary education on the basis of criterion-referenced tests of student performance.

The readiness measures would be useful in determining educational expenditures in the elementary schools. Any test given after a child enters a program of formal education, is on the face of it, less useful,

overcoming the problem of low student performance, for example, the more money it would lose in state grants. On the other hand, criterion-referenced tests for elementary and secondary students are necessary to improve judgments about the amount of money required to help students of different backgrounds and abilities to gain different kinds of intellectual skills. In other words, the criterion-referenced test is needed to regulate the size of grants per students (but not the number of students in a given school district who are to be counted). The Center for the Study of Evaluation (UCLA) is seeking, furthermore, to develop criterion-referenced tests that are "program free". If this is a realistic possibility, then criterion-referenced tests can be put to an even finer use, namely to make judgments about the differential effectiveness of alternative programs of instruction in reading, mathematics, and other fields. The ultimate objective, possibly, is in the minds of the CAM group in New York, as they envisage use of criterion-referenced tests within the school month or week serving as a guide toward classroom management.

Proposal for a Federally-Sponsored Research School

We have suggested several ideas for research and experimentation, ideas which may help alleviate impediments to technological efficiency. The research ideas by and large suggest examining the present educational system and evaluating what goes on within. The proposals for experimentation primarily suggest that new techniques or methods of organization be tested

to see if they work better than the methods currently in existence. For example, we suggested experimenting with new teacher incentive structures, using individuals lacking the traditional credentials as teachers, and using new teaching methods to foster creativity and individuality.

There is a question, however, of where such experimentation should take place. One possible site for experimentation is within the present school system. However, the typical public school does not afford an environment open to such experimentation. The present public school structure operates within the traditional constraints: certification, tenure, course delineation, etc. which do not facilitate establishment of programs requiring different personnel criteria, program content, and teaching approaches. The environment is extremely important to learning and the creative thought process. A more detailed argument, stressing the importance of environment, for an NIE research school is included in Appendix A.

We believe that one of the highest priorities of the NIE should be the establishment of a new research school, preferably located near the NIE offices. Such a school would have several advantages: it avoids the usual constraints on public schools, it avoids some of the political problems faced by public schools, it provides a more "scientific" environment for experimentation, and it directly involves the NIE in research activities.

The research school should not repeat the mistakes of the

"university schools" so often attached to schools of education; those schools are often little more than elite schools for faculty children. Indeed, it would be expected that the majority of students at a federal research school should be those with the greatest disadvantages in terms of home background. The directors of such a school should not be limited to educators, indeed care should be taken to assure inclusion of scholars of many disciplines with interests in education. Those scholars could help maintain the vitality and reputation of the research school.

The proposed school should at first focus on the elementary grades; however, once that part of the school was in full operation, thought might be given to extending the research area to secondary education, also. A research school might serve to attract the critical mass of innovative ideas and brilliant scholars necessary to bring about major changes in the educational system.

The cost of a research school might be high. The planning should be cautious and comprehensive in order to assure that the school is scientifically reputable. However, once the plans are made and the facilities constructed, the annual operational costs should be quite moderate; in bypassing the public school system a costly and bureaucratic step is eliminated.

IV. SOCIAL EFFICIENCY

Social efficiency concerns the equitable distribution of educational goods and services among different social classes and groups in society. As evidenced by recent court decisions there is a societal demand for equality between races and social classes with respect to the opportunities for education, income, and occupation. That this need is not being met is indicated by the disproportionate numbers of whites in institutions of higher education and in prestigious occupations and positions of power.

IMPEDIMENTS TO SOCIAL EFFICIENCY

Of the many impediments to social efficiency, we focus on three. First, the certification function of education may largely serve to label individuals according to social class. Berg [1970] forcefully points out that the relationship between certification or years of education and economic productivity is a dubious one. This system serves to discriminate against those individuals who have the requisite skills but lack the appropriate certificate. Another facet of this impediment to social efficiency is the nature of gate-keeping criteria. I. Q. tests and college entrance exams are culturally biased against students of low socioeconomic status. Such measures inhibit social mobility through education and, thereby, interfere with social efficiency.

A second impediment to social efficiency has recently been well publicized due to the California State Supreme Court decision in Serrano v. Priest. That decision highlighted the fact that rich households receive

expensive educational services at low prices (tax rates), while poor households must suffer very high tax rates to provide themselves with meager services. Two school districts in Los Angeles County exemplify the point: in 1965-66, El Rancho taxed itself at a rate of $4.50 per $100 of assessed valuation to receive school services valued at $548 per student, while a richer community, El Segundo, had a tax rate of $1.82 and received school services valued at $733 per student.

Another facet of the tie between wealth and educational services is evidenced by the fact that even if school expenditures were equal between poor and rich districts, there would still be unequal educational inputs in terms of support (complementary) services, composition of peer group, and teacher quality. This is a matter which has received relatively little attention. Wilson [1967] found that the socioeconomic composition of a student's peer group is an important determinant of verbal achievement, yet poor children have many more low status peers than do rich children within the same district. Other evidence has indicated that within a single school district, the poor receive lower quality teachers and administrators than do the rich, even though expenditures may be similar.

RESEARCH PROPOSALS

We suggest three research proposals designed to help remove some the roadblocks to social efficiency. First, we propose that a study be undertaken of the relationship between certification and economic productivity to ascertain the degree to which social mobility is impeded and the poor are

discriminated against. Employers hire on the basis of certification partly because they lack other criteria to indicate the productivity of individuals. This lack of criteria is related to an earlier research proposal discussed in this paper--the identification and measurement of educational putputs. Once the outputs of education are identified and measured, we can then ask what their relationship is to economic productivity. Research in industrial production functions might offer clues as to the relationships between real educational outputs and productivity (as measured by value of marginal product) for different types of educations and occupations. However, at this point we can simply propose that which has already been proposed in considerable detail--the identification and measurement of educational outputs.

Our second proposal is for a study and perhaps experimentation regarding means of breaking the tie between wealth and educational services at the elementary and secondary level. One of the important questions with respect to the financing of the local schools is how the tie can be broken while retaining local control and responsibility. Levy [1971] has discussed this problem in his paper on school budgeting. Our research proposal in this area is that the NIE evaluate the effects of complimentary services in poverty areas; it should also investigate the trade-off with educational expenditures. Furthermore, we propose that the NIE experiment with providing the students of selected schools in poverty areas with comprehensive complimentary services. These proposals are discussed in more detail below.

A Study of Complementarities and Substitutions Among Various Public Sector Programs

The Problem

Educational productivity cannot always be increased among the poor, it is claimed, by merely increasing or extending educational services. Additional social services may be required or even may be substituted. * What good does it do, argue the proponents of this view, to supply a second reading expert when the child most needs eyeglasses? The War on Poverty, the Head Start programs, Title I of the Elementary and Secondary Education Act, and the School Lunch program all illustrate some recognition of this point. Nonetheless, studies indicate that it is difficult to measure which services are needed, (Stanford, Kraevitz, "Organizing Community Resources...) that such services as school lunch programs may go to those who least need them, and that these services are not often available to the poor.

Research on the Problem

Some preliminary work in this field has been undertaken by Sar A. Levitan and Robert Taggert [1971] whose evaluation of the federally funded Vocational Rehabilitation Program indicates that this effort to combine counselling, medical care, job training and other services "deemed

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* Henry Levin, unpublished preliminary report to New York State Commission on the Quality Cost and Financing of Elementary and Secondary Education, "Aspects of Educational Finance and Equal Opportunity."

necessary for the mentally and physically handicapped was a success." However, they noted that only the most promising applicants were selected. Another sociologist has noted that black people are more often victims of disease, have a seven year lower life expectancy, higher death rate in childbirth, higher unemployment, and poorer housing than the white population [Ehrlich, 1971]. This would give some ideas of areas where supporting social services might show results most quickly.

Research Strategies

We propose that NIE attempt to measure the effects of several different approaches to supplying increased social services to the poor. These services encompass nutritional, psychological or medical services in complement or in substitution for compensatory educational services.

An assessment could be made of the effects of the voucher approach offered by Henry Levin. This method offers vouchers to parents who may choose whether compensatory education would be provided in the form of increased educational services or whether educational services might be combined with other social services, such as needed medical and dental care, psychological counselling, nutritional guidance and meals, or study space in crowded communities.

A second study, and one which would more quickly show results, could be combined with an experiment with saturating a school or schools in poverty areas with multiple services. In addition to those described in the

paragraph above, breakfast and evening meals, plus necessary clothing might appropriately be provided. Family units could be surveyed for adequate study space, parents and siblings joining in counseling or encounter groups in order that they might be supportive to this effort. For maximum effectiveness in changing the output and orientation of a child, the experimental program should involve kindergarten through fourth grade, based upon five year funding. If this saturation experiment is not feasible, at least an evaluative study could be undertaken, comparing achievement in a number of poverty areas according to the number and level of supporting services.

PRIORITIES FOR RESEARCH

We have suggested several research projects and experiments which fall within the range of NIE responsibilities. As we have discussed each proposal we have attempted to show how it is related to other of our proposals. Indeed, different problems sometimes have common solutions. Still, it cannot be expected that the NIE will be able to finance all our proposals in the coming fiscal year. For that reason we make explicit the priorities which we assign to our proposals.

Briefly, our list of high priority proposals (in the order they were discussed in the paper) is as follows:

a. Research and experimentation in decentralized decision making

b. Assessing institutional and classroom efficiency

c. Development of a federal research school

d. Experimentation and evaluation of complimentary services

The schools must be made more responsive to the students and parents they serve. Large bureaucratic structures impede parental participation. Bussing to achieve racial integration can create geographic deterrents to participation and interest in the schools. Finally, proposals to promote equality of educational expenditure through state assumption of educational expenditures carry with them the concommitant danger of a decreased scope for local decision making. All these factors make experimentation with new organizational structures to encourage a parental role and interest in the school a high priority proposal for NIE consideration.

One of the primary duties charged to the NIE by President Nixon in his March 4 speech is determining what affects student learning. The Coleman Report did not answer that question; the usefulness of educational production function analysis has been hindered by the quality of data available. We believe a new approach is required. Our proposal is two-pronged: first, we propose that the NIE attempt to identify "efficient" elementary and secondary schools by controlling for student backgrounds and conducting "follow-up" surveys on graduates; second, we propose that the NIE sponsor attempts by the schools to identify "efficient" classrooms and "effective" teachers through the use of local school information systems. The product both these proposals is the identification of efficient institutions and teaching methods which are duplicable elsewhere.

We believe that the public school system is too bound by tradition and law to permit all the kinds of experiments which the NIE might wish to sponsor. Furthermore, it is important to create a nucleus of educational research which can attract top scholars and serve to disseminate new ideas. A federally sponsored research school would serve these requirements. This, too, we believe is an item of the highest priority and, furthermore, is the sort of project which may have the greatest effect in making the young NIE visible. (For greater detail, see Appendix A.)

Compensatory education has been attempted on a short-term basis and so far has not been very fruitful. Research in educational production consistently show the home to be the most important factor determining a

student's achievement. Yet little research has been done on the role that services complementary education play in determining performance. We feel our proposal that the NIE experiment with providing comprehensive complementary services to children of all ages in the urban slum is of very high priority.

VI. BIBLIOGRAPHY

Becker, Gary S. Human Capital. A Theoretical and Empirical Analysis, with Special Reference to Education, Princeton: Princeton University Press, 1964.

Becker, Howard. "The Career of the Chicago Public School Teacher," American Journal of Sociology, 57:470-77, 1952.

Benson, Charles and Peter Lund. Neighborhood Distribution of Local Public Services, Berkeley: Institute of Governmental Studies, University of California, Berkeley, 1969.

Benson, Charles S. "Economic Analysis of Institutional Alternatives for Providing Education (Public, Private Sector)" in R. L. Johns (ed) Economic Factors Affecting the Financing of Education, National Educational Finance Project, Gainesville, Florida, 1970, pp. 121-172.

nson, Charles S. "How the American Education System Looks from the Standpoint of Systematic Planning," unpublished paper given at the Annual Meeting of the American Educational Research Association, New York City, February 5, 1971.

Berg, Ivar. The Great Training Robbery, New York: Pareger Publishers, Inc., 1970.

Berube, Maurice and Marilyn Gittel. Confrontation at Ocean Hill Brownsville, New York: Frederick Praeger Publishers, 1969.

Blaug, Mark. "The Rate of Return on Investment in Education" in Mark Blaug (ed.), Economics of Education 1, Baltimore: Penguin Books, 1968, pp. 215-262.

Bowles, Samuel. "Towards an Educational Production Function" in W. Lee Hansen (ed.), Education, Income, and Human Capital, New York: Columbia University Press, 1970, pp. 11-60.

Bowman, Mary Jean. "Education and Economic Growth" in Roe L. Johns, et al. (eds), Economic Factors Affecting the Financing of Education,

Burkhead, Jesse. Input and Output in Large-City High Schools, Syracuse: Syracuse University Press, 1967.

Clark, Kenneth. Dark Ghetto: Dilemmas of Social Power, New York: Harper and Row, 1965.

Coleman, James S. et al. Equality of Educational Opportunity, U. S. Dept. of Health Education and Welfare, Office of Education, Washington, D. C., U. S. Government Printing Office, 1966.

Coleman, James S. and Nancy L. Karweit. Multi-Level Information Systems in Education, RAND Corporation Paper P-4377, June 1970.

Cook, Cleo Hernton. "Multi-Cultural Textbook Series," The California Journal for Instructional Improvement, May 1966, Vol. 9, No. 2.

Crain, Robert et al. School Desegregation in the North, Chicago: National Opinion Research Center, University of Chicago, 1966.

Denison, Edward F. Why Growth Rates Differ, Washington: The Brookings Institution, 1967.

Eckhaus, Richard. "Investment in Human Capital: A Comment," Journal of Political Economy, Vol. 71, No. 5, pp. 501-505, 1963.

Edwards, T. Bentley and Frederick Wirt. School Desegregation in the North: The Challenge and the Experience, San Francisco: Chandler Publishers, 1967.

Ehrlich, Howard. "Social Conflict in America," The Sociological Quarterly Summer 1971, pp. 295-307.

Glazer, Nathan and Daniel Moynihan. Beyond the Melting Pot, Cambridge, 1963.

Brier, Eunice. In Search of A Future, Washington, D. C.: Washington Center for Metropolitan Studies, 1.16, July 1963.

Griliches, Zvi. "Notes on the Role of Education in Production Functions and Growth Accounting," in W. Lee Hansen (ed.), Education, Income, and Human Capital, New York: Columbia University Press, 1970, pp. 71-115.

Guthrie, James W., et al. Schools and Inequality, Cambridge, MIT Press, 1971.

Hallman, Howard. Community Control: A Study of Community Corporations and Neighborhood Boards, Washington Center for Metropolitan Studies, 1969.

Hansen, W. Lee. "Total and Private Rates of Return to Investment in Schooling," Journal of Political Economy, Vol. 81, No. 2, pp. 128-141, 1963.

Hanushek, Eric A. The Education of Negroes and Whites, unpublished Ph. D. dissertation, MIT, 1968.

Hanushek, Eric A. and Henry Levin. "A Proposal for a School Information System," unpublished RAND Corporation paper, October 1969.

Heath, Robert. "The Ability of White Teachers to Relate to Black Students and White Students," AERA Journal, Vol. VIII, No. 1, January 1971.

Jablonsky, Adelaide. "Media for Teaching Afro-American Studies," IRCD Bulletin, ERIC Information Retrieval Center on the Disadvantaged, Vol. VI, No. 1 & 2, Spring 1970.

Jencks, C. and D. Riesman. The Academic Revolution, Garden City, N. Y.: Doubleday, 1968.

Jencks, C (ed). Education Vouchers, A Preliminary Report, Financing Education by Payments to Parents, Cambridge, Mass.: Center for the Study of Public Policy, March 1970.

Katz, Irwin. "Review of Evidence Relating to Effects of Desegregation on Intellectual Performance of Negroes," American Psychologist, 19: 381-399, 1964.

Katz, Irwin. "Academic Motivation and Equal Educational Opportunity," Harvard Educational Review, 38: 57-65, 1968.

Knowles, Louis and Kenneth Prewitt, (eds.). Institutional Racism in America, Englewood Cliffs, N. J.: Prentice Hall, 1969.

Kohl, Herbert. 36 Children, New York: Signet Books, 1967.

Kozol, Jonothan. Death At An Early Age, Boston: Houghton Mifflin, 1967.

Lawrence, Ben et al. (eds). Outputs of Higher Education: Their Identification, Measurement, and Evaluation, Boulder: Western Interstate Commission for Higher Education, July 1970.

Levin, Henry (ed). Community Control of Schools, Washington, D. C.: Brookings Institution, 1970.

Levin, Henry. "A Cost-Effectiveness Analysis of Teacher Selection." The Journal of Human Resources, Vol. 5, No. 1, Winter 1970, pp. 24-33.

Levin, Henry. "The Effect of Different Levels of Expenditure on Educational Output," in Economic Factors Affecting the Financing of Education, Roe Johns et al. (eds.). National Educational Finance Project, Vol. 2, pp. 173-201, 1970.

Levin, Henry. Aspects of Educational Finance and Equal Opportunity, unpublished preliminary report to the New York State Commission on the Quality, Cost, and Financing of Education, Aug. 1971.

Levin, Henry M. "Concepts of Economic Efficiency and Educational Production," unpublished paper given at the National Bureau of Economic Research Conference on Education as an Industry, Chicago, June 4-5, 1971.

Levitan, Sar A. and Robert Taggart III. Social Experimentation and Manpower Policy: The Rhetoric and the Reality, Baltimore: Johns Hopkins Press, 1971, p. 10.

Levy, Frank. "Resource Allocation in the Oakland Public Schools," in Aaron Wildavsky and Arnold Meltsner (eds.), The Political Economy of Oakland, Berkeley: University of California Press, 1972.

Lowndes, G. A. N. The English Educational System, London: Hutchinson University, Library, 1961.

Marvick, Dwaine. "The Political Socialization of the American Negro," in The Annals of the American Academy of Political and Social Science, September 1965.

Michaelson, Stephen. "Rational Income Decisions of Negroes and Everyone Else," Industrial and Labor Relations Review, Vol. 23, No. 1, October 1969, pp. 15-28.

Minar, David. "Community Characteristics, Conflict and Power Structures," in Robert Cahill and Stephen Hencley (eds.), The Politics of Education, Danville, Illinois: Interstate, 1964.

Nails, Odell. Positive Self-Concept As An Influence for Academic Achievement in Inner City Schools, unpublished dissertation, Wayne State, 1970.

New York State Commission on the Quality, Cost, and Financing of Elementary and Secondary Education. Report of the New York State Commission. in press.

Oettinger, A. G. (with the coll. of Sema Marks). Run Computer Run, Cambridge, Mass: Harvard University Press, 1969.

Organization for Economic Cooperation and Development. Methods and Statistical Needs for Educational Planning, Paris, 1967.

Patterson, Orlando. "Rethinking Black History," Harvard Educational Review, Vol. 41, No. 3, August 1971, pp. 297-310.

Pivan, Francis Fox and Richard Cloward. Regulating the Poor: The Function of Public Welfare, New York: Pantheon, 1971.

Remsberg, Charles. School without Lunch, Impact, Washington, D. C.: New Community Press, 1969.

Ribich, Thomas. Education and Poverty, Washington, D. C.: The Brookings Institution, 1968.

Rogers, David. 110 Livingston Street, New York: Random House, 1968.

Sexton, Patricia Cayo. Education and Income, New York: The Viking Press, 1961.

Silberman, Charles. Crisis in Black and White, New York: Random House, 1964.

Stanford, Kraevitz. "Organizing Community Resources, The Issue of Delivery of Services, in Reuben Margolin and George Goldin (eds.), Research Utilization Conference on Rehabilitation in Poverty Settings, Northeastern University, Boston, Mass., May 1969, pp. 37-53.

Steiner, Stan. La Raza, The Mexican Americans, New York: Harper & Row, 1969.

St. John, Nancy. "Desegregation and Minority Group Performance," Review of Educational Research, February 1970, Vol. 40, No. 1, pp. 111-129.

Suttles, Gerald. The Social Order of the Slums, Chicago: University of Chicago Press, 1968.

Thomas, J. A. The Productive School: A Systems Analysis Approach to Educational Administration, J. Wiley & Sons, 1971.

U. S. Department of Health Education and Welfare. Office of Education. Report of Yale Seminar on Music, Bulletin No. 28, 1964, OE-33033.

U. S. Riot Commission Report. Report of the National Advisory Commission on Civil Disorders, New York: Bantam Books, 1968.

Vogel, Virgil. "The Indian in American History Textbooks," Integrated Education, Issue 33, July 25, 1968.

Weisbrod, Barton A. "Education and Investment in Human Capital," Journal of Political Economy, Vol. 70, No. 5, Part 2, pp. 106-123, 1962.

Wilson, Alan B. "Educational Consequences of Segregation in a California Community," U. S. Commission on Civil Rights, Racial Isolation in the Public Schools, Washington, D. C.: U. S. Government Printing Office, 1967.

Winkler, Donald R. The Production of Human Capital: A Study of the Production of Minority Achievement, unpublished Ph. D. dissertation, Berkeley, University of California, 1971.

Wolfle, Dael and Charles V. Kidd. "The Future Market for Ph. D.'s," Science, Vol. 173, August 27, 1971, pp. 784-793.

APPENDIX A

FOSTERING CREATIVITY IN THE OPEN SYSTEM

Introduction

It is too clear and so it is hard to see.
A man once searched for a fire with a lighted lantern.
Had he known what fire was,
He could have cooked his rice much sooner.*

Educational methods should employ hueristics rather than didactics to foster creativity. This paper will define 1) the creative process, product and person; 2) the demand for increased creativity; 3) impediments presently operating to thwart educational programs which foster creativity--social and resource impediments; 4) the importance of environment on the creative process, the positive aspects of the open system and the impediments of the closed system; 5) suggested research, the current status and the rationale for additional research.

Creativity, What is it?**

Creativity "...is a rubric under which we can identify separable

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*A Zen Buddhist story. Harold Taylor, Art and the Intellect (Garden City, New York: Doubleday & Company, Inc., 1960) p. 38.

**The terms of definition vary depending on the source. The elements of the process described by authors hold much in common. See MacKinnon in Creativity: Nobel Conference, Minnesota, 1970

Dow states it is the triumph of principle and truth over conformity. Gordon Parks describes the process as effort to reveal experiences in a different way, through different medium. He advises, know your "craft," use it, experiment. Anderson discusses seven hypothesized abilities of the creative person

but interrelated aspects; the creative person, the creative process, product, person and situation or environment."

Process

1. Must be aware of a problem.

2. Problem must be properly perceived and correctly defined. May require ability to see the problem in a light different from that in which it was presented, ability to conduct sustained analysis, ability to reconstruct, recognize variables influencing an event, recognize analogies, similes, metaphors.

3. Must have sufficient knowledge, but not "mental dazzle." Given the above, MacKinnon orders the process as follows:
   ...preparation: acquire experience, cognitive skills and techniques which make it possible to pose a problem to oneself.
   ...attempt: period of concentrated effort to solve problem (usually frustration tension).
   ...recess: withdrawal from problem, incubation.
   ...insight: "a-ha" the idea for the solution.
   ...application: verify, evaluate, elaborate and apply concept for solution.

Product--The Criteria of a Creative Product

1. Novelty - originality. This is relative to a given population of

studied by Gilford:

1. able to identify problem, recognize inadequate solutions
2. fluent thinker, able to retrieve ideas from storage
3. flexible thinker, able to shift directions, alternatives considered
4. original in thought; the idea is infrequent in the given situation
5. ability to synthesize
6. ability to redefine problem
7. ability to penetrate, to be thorough in approach
8. ability to perceive changes of meaning, "cognitive ability."

"The areas of divergent production (2, 3, 4, 7) should be of considerable importance, for such abilities should make positive contributions to personal and social adjustment."

products; that is, it may be original to the individual, to the society.

2. Accomplish a goal. Be it artistic (a more appropriate expression of the artist's experience) or scientific.

3. Must be produced. The insightful reorganization which underlies it must be sustained, evaluated, elaborated, developed, and communicated to others.

4. The solution must be both true and beautiful.

5. The product creates new conditions of human condition; that is, changes man's view of the world such as Freud's psychoanalysis, Darwin's evolution, or the paintings of Cezanne.

Person (Research at Institute of Personality Assessment and Research)

1. Correlation between measured intelligence and judged creativeness.

2. Little relationship between academic performance and judged creativeness.

3. Independent in thought and action. High marks in areas of high interest, low in areas of little interest.

4. Courage to experience the opposites of nature and to reconcile them in individuated expression of self.

The Demand for More Open or Creative Concepts in Education

As Olton and Crutchfield state, today's educational efforts concentrate on teaching children to master the known, not the unknown. Yet we will be expected to cope with the unknown, which requires the ability to solve problems independently. Some of these problems not only require creative solution, but their presence affects the ability of the individual to be creative. For example: the closed system of education reduces the [illegible]

individual, identity is more difficult, the situation more impersonal. At the same time the worker force may face the four-day work week and could use creativity to channel leisure into constructive rewarding endeavors.

In a recent Gallup poll parents indicated that children should be taught to think for themselves.* Children should be taught to think, not only to memorize.**

Social Impediments to Creativity***

Inadequate concern for the value of creativity hinders those who might otherwise develop creative potential. We value Social Rightness to the exclusion of Individual Rightness (Alden Dow). We reward conformity for social good. Creativity and individuality are given low priority; conformity is given high priority by society (Hodgkinson). These low priorities are perhaps due to inadequate understanding of the true meaning of creativity. Creativity is not restricted to the arts but is of great importance in medicine, law, city planning, et cetera. Few patients wish to be seen by a doctor who can diagnose a typical case of appendicitis but fails to recognize other possibilities. (George

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*Robert M. Olton and Richard S. Crutchfield, "Developing the Skills of Productive Thinking" (Berkeley: University of California).

**Harold Taylor, Art and the Intellect (Museum of Modern Art, N.Y.)

***See The Creative Situation--The Impact of the Environment on the Creative Process: Closed System, page 7.

Bernard Shaw was well aware of this danger. He states:

> "It does happen exceptionally that a practising doctor makes a contribution to science...but it happens much oftener that he draws disastrous conclusions from his clinical experience because he has no conception of scientific method and believes, like any rustic, that the handling of evidence and statistics needs no expertness."

The Doctor's Dilemma

There is no difference between scientific and artistic creativity. Dewey felt the creative thought process was of greater value in science than in art. Creativity should be viewed as an intellectual process applicable to many fields.

Resource Impediments

Due to inadequate teacher training programs and inappropriate credential requirements, there are insufficient personnel to implement open-system programs. The system is not organized to create a school independent of district requirements; hence the environment is inadequate for open-system programs. We have inadequate measures to determine creativity and to assess the effectiveness of teaching approaches. This will be discussed in greater detail in the section of Research Suggestions and Rationale.

We have inadequate knowledge of the potential effect of technology i.e., use of teaching machines, impact of drugs, or means to synthesize research in the field or dissemination models.

The Creative Situation--The Impact of the Environment on the Creative Process

We know the environment affects the level of individual creativity. Some characteristics of an environment foster creativity and others thwart it.

The Open System

The environment conducive to creativity is an open, harmonious one, offering the individual acceptance and stimulation. It is a positive social climate. As Anderson describes his concept of the Open System:

> "Life is an open system, and one can live fully only in proportion to a harmonious or integrative interacting with persons in his environment. Creativity as an unfolding or flowing of individual differences presupposes a person in a propitious environment. Creativity, as a process, is thus not found solely in the person; it is found in the interacting of person to environment. Life can be creative to the extent that the interacting is harmonious. Persons in the environment can facilitate or retard the interacting. To the extent the interacting is threatening or lacking in harmony, the person becomes defensive and to this extent lacking in his expression of originality. The harmonious environment must have two characteristics: 1) acceptance, and 2) stimulation. Thelatter must be non-threatening; i.e., through the mutual and reciprocal interweaving of spontaneities, through the confronting and free interplay of differences, through acceptance of individual perception and thinking."

The Open System is the environment where the teacher recognizes individual interests, levels of knowledge and pace of learning. The individual perception is worthy. The balance between social rightness and individual rightness is maintained. Students learn through problem solving, they are able to employ the creative process as discussed above. In the open environment the student becomes increasingly self-directed; he is willing to support or change his

convictions. He is exposed to alternatives, accumulates experience, and uses memory, reason, and imagination to gain insight. The reward system is not coupled with regurgitation of the one right answer. The Open System is free of the elements which are described in The Closed System.

The Closed System

The closed system is not conducive to creativity. Many aspects of today's educational process are closed. Methodology rewards regurgitation, the one right answer, the authoritarian teacher role, teacher directed activity, sublimation of the importance of the individual to the socialization of the group, success is getting along with the group and performing at the norm, the concept of creativity is presented in the feminine context (i.e., boys don't paint, girls don't build with blocks, girls don't major in math, engineering or law, girls like poetry, boys like sports, et cetera).

What Impediments Perpetuate the Closed System?

Tradition

Control is a tradition in our school system. The classroom environment is controlled by the teacher. She decides on the amount of interaction, on the bestowing of rewards, on the questions, and on the right answers. Typically, the correct answer is dependent on the experience of another (teacher or text), not on the redefinition of the child's experience. The correct answer is recalled through memorization rather than application

of the creative process. The importance of the individual student perspective is minimized. The classroom environment balance is tipped toward social rightness at the expense of individual rightness. As Dow comments, when the system is out of balance the individual compensates.* Some students compensate by dropping out.

We limit interaction and exposure to new environments by our concept of "education." Personnel are hired for their teaching credential, not for their knowledge and ability. They are rewarded for their longevity and units, not for the processes which they develop and for the results they achieve. We exclude the knowledgeable expert who has no credential. We use time in ways not conducive to the creative process; creativity requires blocks of time sufficient to struggle to a solution. We confine the concept of education to the public or private four walls rather than considering a richer mix of school, mentorship, work, et cetera. All of the above lead to the closed, and hence the non-creative, environment.

Measures

Effectiveness measures also perpetuate the closed system. It has been said that I.Q. tests predict student performance. Therefore, they classify students. Students labelled "average" by I.Q. are faced by

*See Alden Dow in Creativity: Nobel Conference, Gustavus Adolphus College, St. Peter, Minnesota, 1970.

teachers who expect the student to be average.* People tend to fulfill expectations about their behavior.

Anderson and Hodgkinson both point out the abilities called creative fit logically into the general context of intellectual abilities. Anderson states that a study of creativity requires a broader concept of intelligence than is afforded by the I.Q. Those designated creative may score lower on an I.Q. test than the individual performing at the same level within the class. Does I.Q. predict? We also know teachers tend to prefer or "reward" the answers to questions offered by the higher I.Q. scorer. Is it because they offer more predictable answers, as Hodgkinson suggests? Or is it because these students' answers are preferred because the teacher expectancy for them is higher?

Gate Keeping Criteria

We presently use I.Q. and GRE scores and average grades as criteria for college entrance. We already know the limitations of I.Q. scores. In addition, MacKinnon and others tell us that the creative individual will do better in a subject area and environment which motivates him and he will do poorly when not motivated. If we do no wish to exclude the creative individual, it would be wise to consider the pattern of grades, not the average.

The public school offers a set of rewards and requirements designed

*R. Rosenthal and L. Jacobson, Pygmalion in the Classroom (New York: Holt, Rinehart and Winston, Inc., 1968)

to foster conformity. Success is happiness; happiness is getting along with others in your group. Rewards are offered for social ability, i.e., how does the individual relate to the group rather than how does the individual develop his potential.

The student who progresses too quickly is suspect as well as the student who progresses slowly. The honor system rewards consistence in a required group of courses for different tracts of youngsters. Based on the norm, one is either above and successful or below and a failure. Are these outdated motivations and gatekeepers?

Suggested Research

Students receive educational services in a manner which pays little regard to the potential of the development of creativity. Public education presently reinforces the closed system. Would we continue to perpetuate the closed system if we included creativity in our definition of success, along with I.Q. and the ability to "get along"? We think not. What is needed to move toward the open system?

The Development of Wider Range of Effectiveness Criteria

We presently rely on I.Q. and achievement tests for evaluation of student progress and educational effectiveness.

> "Our mental testing is an area of psychological activity which reveals the wide extent of the closed system. Practically all intelligence tests, ability tests, and achievement tests represent closed-system performance

> In these tests the goal, the ideal performance, success, is conformity to the examiner's norms, to his standards of excellence, his criteria of desirable or even usable behavior. We are just beginning to discover the meaning and the limitations of the Closed System in our past endeavors in psychological testing. For 20 years we have known that there is something beyond the I.Q. of 140 that is important for productivity. But for 20 years we have known that it is not additional I.W. points that make the difference. We have failed to note that originality or creativity adds little to the child's I.Q. score. We do not realize, for example, that in Terman's genetic studies of 'genius' the subjects were selected on the basis of their performance on closed system 'normative' tests with answers in the back of the test manual. Now in retrospect, it is not surprising that the children of Terman's study, while developing into intellectually competent adults, have not generally distinguished themselves by their great originality or invention in the arts and sciences. We have only now noted that these mental test 'geniuses' were selected not on the basis of a demonstrated originality or uniqueness in their responses but on the basis of their swift and superior conformity to the cultural norms."*

Measures of Creativity Need To Be Developed

Such measures should afford indentification of the creative individual, process, and product; identification of the creative environment and measures of the characteristics within the environment; measurements of the interaction between the individual and the environment. Not only do we lack adequate measures of the effect of an open-system environment; we lack the open system to measure.

Current measures of creativity ask the subject to respond to a question in a contrived situation; i.e., the problem is already defined, the time is limited, and the solution will not be tested by application. The product, not the process,

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*Harold H. Anderson, Creativity in Childhood and Adolescence. American Orthopsychiatric Association

is measured. The criteria for "creative" is an usual response in this situation. It becomes difficult to distinguish bizarre from creative. One example question was, What is the consequence of having eyes in the back of your head? Not a very real problem. In the actual creative process, the subject should identify and redefine the problem; he takes as much time as necessary to solve the problem. He also tests his solution and if necessary continues the process. Current measures fail identify the process through which the individual arrives at a solution. It may be important to identify the approach at every step. This is a failing of educational evaluation. No wonder we cannot say what works. We look at the input and the output; not what transpired in the process.

Creative measures should be projective measures which permit the child to respond freely with alternatives and to test the alternatives. The normative testing situation is inappropriate, as it is the antithesis of the creative environment.*

Current measures are contrived and fail to examine the essential elements of creativity or the educational process.

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*Anderson developed a series of unfinished stories which he gave to German and American children. He wanted to determine the influence of the role of authority in society on the response. He found a marked difference in replies (according to our conversation). German children fabricated stories to avoid reprimands of authority; Americans did so less often. I am unsure of the relevance of the study, since the situation is contrived and the presence of authority does hamper the ability to "be oneself".

Other Measures

We also need measures which tell us more than the student's relation to his peers. We need measures that tell us what he is actually able to do. These measures should be free of a cultural selecting-out process.

RESEARCH SUGGESTIONS

"The School" -- The Importance of Environment

To glean the ultimate from measures of creativity, we need an open system to measure. Creative processes should be administered in an environment which has characteristics conducive to creative though processes. We know this process has several steps and is necessary to arrive at a creative solution to a problem. We can identify some aspects of environment known to be conducive to the process and others which are detrimental. We know creativity is not limited to the arts; it is a frame of mind appropriately applied to problem solving in any field. Hence, the environment fostering creativity is appropriate for all subject matter.

The typical public school does not afford such an open environment. The present public school structure operates with traditional constraints; i.e., certification, tenure, salary schedules, class size, course delineation, et cetera, which do not facilitate establishment of a program requiring a different set of personnel criteria, use of space, program content, and teaching approaches. To evaluate the creative environment in the present public system would be impossible.

We purposely call what we wish to propose "The School", rather than an experimental school or an alternative school. It is not an experimental school subject to the restrictions of the present public system, but one with the addition of new program content and goals. It is not a free school subject to the desires of a group of parents. It is a research school to be run by a university in an area of racially and socio-economically mixed population. The School's prime objective is to use the creative approach in all subject areas (arts, language, science, mathematics, crafts, social sciences, et cetera) to determine the mix of staff qualifications and differentiation (credentialed, non-credentialed, professional non-credentialed)*, the staff structure, the site space utilization (the school site as well as community sites such as museums, labs, studios, et cetera) to conduct on-going observation of student response to environment and problem solving. Although The School may identify affective methods of teaching, it is not to repeat the error of developing "innovative materials" to be dropped into a closed system. It is to be a step toward a new system.** This should be a long-range program of

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*U.S. Office of Health, Education and Welfare, Office of Education Bureau of Educational Personnel Development, Do Teachers Make a Difference? A Report of Recent Research on Pupil Achievement (Washington, D.C.: U.S. Government Printing Office, 1970).

**Covington, Crutchfield and Davies state that directed training brings about measurable improvement in the individual's skilled use of developing capacity for productive thought. However, the reader is no doubt aware of the manner in which training is delivered, and the environment in which it is delivered, and the environment in which it is delivered is as crucial as the materials.

five to ten years. Funding should be for this duration. The director should be given one year in advance of the opening of The School at full salary to plan for The School with selected staff. At the end of five years of operation, the knowledge gained from The School should be channeled into the public system. Perhaps we would then elect to discontinue teaching approaches which thwart creativity when offered a demonstrated alternative.

As Hacker comments,

> "The distinct practical possibility of educational, psychological, and social planning for creativity exists and can neigher be legislated, ordered, manufactured, nor directly produced nor predicted. But a climate of creativity can be created which maximizes the chances of its occurence and facilitates its mode of expression. Approaching this problem creatively, ie. e, with serious playfulness, is (as yet) a socially and culturally untried possibility. The gamble with creative adventure may prove to be more successful than the reliance on safety, realism, and certainty. Possibly, the next great creative enterprise may be the planning for the unplanned and a novel strategy of readiness for the unpredictable, unexpected, and unprecedented."*

We have discussed the creative process, product and person; the demand for increased creativity; the impediments which presently hinder an open educational system; the importance of environment on the creative process; and the current status of research in the field and the rationale for research endeavors and environment.

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* See Frederick J. Hacker, in Creativity in Childhood and Adolescence. Harold H. Anderson, editor.

To continue to develop materials to be placed in an inadequate system, when we need a new system; to attempt to be concerned with input and output to the exclusion of process; to make decisions concerning program content and student ability based on inadequate measures and insufficient data; and to perpetuate the closed system, is unnecessary.

BIBLIOGRAPHY

Anderson, Harold H., editor. Creativity in Childhood and Adolescence. American Orthopsychiatric Association, 1965 Los Angeles Workshop. Science and Behavior Books, Inc. 1965.

Beggs, David W. Independent Study. Bloomington, Indiana: Indiana University Press. 1965.

Creativity: A Discussion at the Nobel Conference, Gustavus Adolphus College, St. Peter, Minnesota, 1970. Amsterdam, Holland and London, England: North Holland Publishing Company. New York, New York: Fleet Academic Editions, Inc.

Davis, Russell C. Planning Human Resource Development: Educational Models and Schemata. Chicago, Illinois: Rand McNally Publishing Company, Inc. 1966.

Garry, Ralph and Howard L. Kingsley. The Nature and Conditions of Learning. The Ontario Institute for Studies in Education. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1967.

Guthrie, James W. and Edward Wynne. New Models for American Education. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1971.

Havinghurst, Robert T. and Bernice L. Neugarten. Society and Education. Boston, Massachusetts: Allyn and Bacon, Inc. Third Edition. 1967.

Hodgkinson, Harold L. Education, Interaction, and Social Change. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 1967.

Inter-Disciplinary Symposia on Creativity. Michigan State University, 1957-1958. New York, New York: Harper and Brothers, Publishers.

Jose, Jean and John J. Cody. "Teacher-Pupil Interaction As It Relates to Attempted Changes in Teacher Expectancy of Academic Ability and Achievement." American Educational Research Journal. January 1971.

Kintsch, Walter. Learning, Memory and Conceptual Processes. New York, New York: John Wiley and Sons, Inc. 1970

Michael, William B. Teaching for Creative Endeavor. Bloomington, Indiana, and London, England: Indiana University Press. 1968

Olton, Robert M. and Richard S. Crutchfield. "Developing the Skills of Productive Thinking." University of California at Berkeley.

Taylor, Harold. Art and the Intellect, Moral Values and the Experience of Art. New York, New York: The Museum of Modern Art, New York, for the National Committee on Art Education. 1961.

United States Department of Health, Education, and Welfare; Office of Education, Bureau of Educational Personnel Development. Do Teachers Make a Difference? A Report of Recent Research on Pupil Achievement. Washington, D. C.: U.S. Government Printing Office. 1970.